

Notice of Allowability

Application No.

09/464,315

Examiner

Dwin M. Craig

Applicant(s)

DU ET AL.

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/5/2006.
2. ☒ The allowed claim(s) is/are 28-37.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>9/17/2002</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

NOTICE OF ALLOWANCE

And

EXAMINER'S AMENDMENT

1. Claims 28-37 are allowed.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview(s) with Carlton H. Hoel Reg. No. 29,934 on 2/9/2007 and on 2/28/2007.

The application has been amended as follows:

In the specification beginning on page 1, line 2 the paragraph has been changed to:

-- This application is a continuation-in-part of copending application serial number 09/451,697, filed November 30, 1999, now U.S. Patent 6,768,977, which is incorporated herein by reference. --

Page 3 line 26 following the phrase "09/388,508," the phrase -- now U.S. Patent 6,184,645—has been inserted.

Page 3 line 29 following the phrase "09/388,508," the phrase – now U.S. Patent 6,204,629 – has been inserted.

In the specification on page 8 line 25 has been changed from "serial number ." to -- serial number 09,451,697 now U.S. Patent number 6,768,977. --

Art Unit: 2123

Claim 28 has been changed to:

-- A method of back electromotive force measurement, comprising the steps of:

(a) estimating eddy currents induced by a current in a first direction through a voice coil;

(b) turning off a driver for the current in said first direction through said voice coil;

(c) for a time interval, turning on a driver for a current in a second direction through said voice coil, where said second direction is opposite said first direction and said time interval is determined from the results of said estimating;

(d) after said time interval, measuring a back electromotive force of said voice coil. --

Claim 29 has been changed to:

-- The method of claim 28, wherein said estimating eddy currents is by timing a decay of flyback current through said voice coil following said turning off in step (b) of claim 28. --

Claim 31 has been changed to:

-- The method of claim 28, wherein said turning off of step (b) of claim 28 includes turning off a first pair of transistors in an H-bridge connected to said voice coil and between a power supply and a power sink, and wherein said turning on step of step (c) of claim 28 includes turning on a second pair of transistors of said H-bridge. --

REASONS FOR ALLOWANCE

3. The following is an examiner's statement of reasons for allowance:

While *Male* teaches a method of back electromotive force measurement in system containing a voice coil and U.S. Patent 4,653,681 to Dreibelbis teaches an eddy current probe in a system for controlling a voice coil (see Figure(s) 5 & 6 item # 84 and Figure 3 item # 53 and

Art Unit: 2123

Figure 4 item #5 and Col. 2 lines 38-45 and Col. 3 lines 65-68 and Col. 4 lines 1-38) and U.S. Patent 6,064,546 to Takano teaches estimating eddy current loss in a magnetic storage apparatus, see (Figure(s) 8 & 9 and more specifically Col. 3 lines 50-51 "...it is possible to estimate eddy current loss...") **none of these references taken either alone or in combination with the prior art of record disclose** an eddy current estimating method or circuit coupled with a back electromotive force measuring circuit for use in controlling a voice coil, specifically including:

(claim 28) "estimating eddy currents induced by a current in a first direction through a voice coil; turning off a driver for the current in the voice coil in the first direction; for a time interval, turning on a driver for a current in a second direction through said voice coil, where said second direction is opposite said first direction and said time interval is determined from the results of said estimating",

(claim 32) "an estimator control circuit coupled to said current driver circuit and to said positioning control circuit; and a back electromotive force measuring circuit coupled to said current driver",

(claim 35) "an estimator control circuit coupled to said current driver circuit and to said positioning control circuit; and a back electromotive force measuring circuit coupled to said current driver", **in combination with the remaining elements and features of the claimed invention.**

Further, and in regards to Applicants' arguments presented in the 12/05/2006 responses, on page(s) 5 & 6 regarding how *Male* fails to teach or suggest recognition of eddy currents and further how *Male* fails to teach or suggest a fixed time interval and the current being applied flowing in an opposite direction, have been in combination with the specifically claimed

Art Unit: 2123

limitation of *estimating eddy currents induced by a current in a first direction* in reference to claim 28, and further and in reference to claims 32 and 35 the limitations of *an estimator control circuit and a back electromotive force measuring circuit*, have been persuasive and therefore the Examiner hereby withdraws the previously applied 102/103 rejections to the claims.

3.2 Dependent claims 29-31, 33, 34, 36 and 37 are allowed for at least the reason that they depend upon an allowed base claim.

3.3 Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

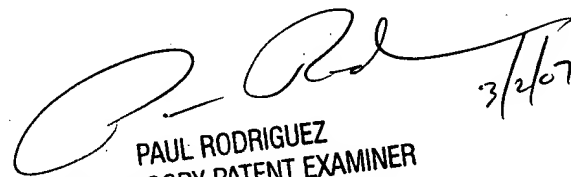
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwin M. Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2123

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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3/2/07